Multiple Choice Questions – 1

(All questions carry 1 mark)

1. Optimization is the method of finding
   a. the maximum point
   b. the minimum point
   c. the best available point
   d. all of the above
2. Maximization of $f(X)$ is equivalent to
   a. minimization of $-f(X)$
   b. minimization of $f(-X)$
   c. minimization of $\sqrt{f(-X)}$
   d. none of the above
3. The condition for a stationary point is
   a. $f'(X) = 0$
   b. $f''(X) = 0$
   c. $f'(X) > 0$
   d. $f''(X) > 0$
4. The condition for a saddle point is
   a. $f'(X) > 0$
   b. $f''(X) = 0$
   c. $f'(X) = 0$
   d. $f''(X) > 0$
5. Unimodal function has
   a. only one peak or valley
   b. one peak and one valley
   c. two peak and two valley
   d. any number of peak and valley
6. Choose the correct statement
   a. optimization problems should have only one objective function
   b. constraint functions are compulsory for any optimization problem
   c. objective function must be a continuous function
   d. none of the above

7. Direct substitution method is used for
   a. unconstrained optimization
   b. constrained optimization
   c. multiobjective optimization
   d. all of the above
8. Parameter estimation is usually
   a. unconstrained optimization
   b. constrained optimization
   c. multiobjective optimization
   d. all of the above
9. Local optimizer and global optimizer are same for
   a. any continuous function
   b. multimodal function
   c. discrete function
   d. unimodal function
10. The condition for a maximum point is
   a. $f'(X) = 0$
   b. $f''(X) = 0$
   c. $f''(X) < 0$
   d. $f''(X) > 0$
11. Choose the correct statement
   a. for a discrete function, optimization is not possible
   b. for a discrete function, optimization is possible using search method
   c. for a discrete function, optimization is possible using Newton method
   d. all statements are correct
12. The Lagrange multiplier method is used to solve
   a. unconstrained optimization
   b. constrained optimization
   c. multiobjective optimization
   d. all of the above
13. Dichotomous search method is applicable for
   a. unimodal function
   b. multimodal function
   c. multiobjective optimization
   d. all of the above
14. The number of stationary points for $f(X) = x_1^3 - 6x_1^2 + x_2^3 - 12x_2^2$ is
   a. 2
   b. 3
   c. 4
   d. 5
15. For what value of x, is the function $x^2 - 3x - 6$ minimized?
   a. 0
   b. 1
   c. 1.5
   d. 3
16. Random Search method is a.....order method
   a. zero
   b. first
   c. second
   d. none of the above
17. Golden section method is a
   a. zero
   b. first
   c. second
   d. none of the above

18. Newton method
    a. is a zero order method
    b. use only first derivative of the function
    c. use first and second derivative of the function
    d. use higher than 2 order derivatives
19. The Trust-Region methods
    a. the iteration is performed along some specific direction
    b. try to find the net approximate solution within a region of the current iterate
    c. follow a zigzag direction for iteration
    d. all of the above
20. The Trust-Region methods usually
    a. consider the quadratic approximation of the objective function
    b. consider the linear approximation of the objective function
    c. consider the cubic approximation of the objective function
    d. do not consider any approximation for the objective function
21. Trust-Region radius
    a. determines size of the Trust-Region
    b. is always 1 for a optimized solution
    c. increases during optimization
    d. None of the above
22. The Trust-Region methods
    a. are applicable for only linear programming problems
    b. are applicable for nonlinear programming problems
    c. are applicable for only unconstrained optimization problems
    d. are applicable for only integer programming
23. The Trust-Region methods terminate when
    a. the trust region radius $\Delta_k \to 0$ as $k \to \infty$
    b. the trust region radius Δ_k shrunk to less than termination criteria ε
    c. the change in the objective function value $|f(x_k) - f(x_{k+1})|$ is less than termination criteria ε
    d. all of the above
24. Direct search methods are used for
    a. constrained optimization
    b. multiobjective optimization
    c. stochastic optimization
    d. unconstrained optimization problem
25. Example of direct search method
    a. random search methods
    b. random jumping methods
    c. random walk methods
    d. all of these

26. Grid search method is a
    a. zero order method
    b. first order method
    c. second order method
    d. fourth order method
27. The univariate method
    a. generates trial solution for one variable keeping all other fixed
    b. finds the local or relative optimum
    c. is useful for unconstrained optimization
    d. all of the above
28. Powel's method is
    a. random search method
    b. univariate method
    c. pattern search method
    d. random walk method
29. Hooke-Jeeves method is used to solve
    a. multivariable optimization problem
    b. unconstrained optimization problem
    c. nonlinear optimization problem
    d. all of the above
30. Hooke-Jeeves method consists of two major routines
    a. exploratory move & pattern move
    b. minor move & major move
    c. first order move & second order move
    d. direct move & indirect move
31. Steepest Descent method is
    a. zero order method
    b. first order method
    c. second order method
    d. fourth order method
32. Fletcher-Reeves method use
    a. steepest ascent direction
    b. conjugate gradient direction
    c. steepest descent direction
    d. pattern search method
33. Newton's method
    a. can solve only single variable optimization problem
    b. can solve multivariable optimization problem
    c. can solve discrete optimization problem
    d. can solve stochastic optimization problem
34. Choose the correct statement
    a. Marquardt method follows the same algorithm as Newton's method
    b. Marquardt method follows the steepest descent method with higher step size
    c. Marquardt method takes the advantage of both steepest descent and Newton's method
    d. Marquardt method follows the same algorithm as Fletcher-Reeves method
35. The constrained optimization problem
    a. should satisfy all the constraints
    b. should satisfy any one of the constraint functions

c. may violate all the constraints
d. none of the above

36. Graphical method of linear programming is useful when the number of decision variables are
a. two b. three
c. finite d. infinite

37. In a given system of m simultaneous linear equations in n unknowns ($m < n$) there will be
a. n basic variables. b. m basic variables.
c. $(n - m)$ basic variables. d. $(n + m)$ basic variables

38. A feasible solution to a linear programming problem
a. must satisfy all the constraints of the problem simultaneously
b. need not satisfy all of the constraints, only some of them
c. must be a corner point of the feasible region
d. must optimize the value of the objective function

39. While solving a linear programming problem infeasibility may be removed by
a. adding another constraint b. adding another variable
c. removing a constraint d. removing a variable

40. For any primal problem and its dual
a. optimal value of objective functions is same
b. primal will have an optimal solution iff dual does too.
c. both primal and dual cannot be infeasible.
d. dual will have an optimal solution iff primal does too

41. If the constraints of an Linear Programming Problem has an in equation of ≥ type, the variable to be added to are
a. slack b. surplus
c. artificial d. decision

42. The cost of a slack variable is
a. 1 b. –1
c. 0 d. M

43. A Linear Programming Problem in which all components of x are additionally constrained to be integer is called
a. pure integer programming problem b. mixed integer programming problem
c. zero-one programming problem d. continuous programming problem

44. Find the maximum of the function $2x_1 - 5x_2$, with constraint $x_1 + x_2 \leq 3$
a. 6 b. 12
c. 0 d. 15

45. A Linear Programming Problem in which only some of the components of x are additionally constrained to be integer is called
    a. pure integer programming problem
    b. mixed integer programming problem
    c. zero-one programming problem
    d. continuous programming problem
46. Find the optimum point where $2x_1 + 7x_2$ is maximum
    a. [2,7]
    b. [0,0]
    c. [1,1]
    d. unbound solution
47. If all the variables of an integer programming problem are either 0 or 1 the problem is called
    a. pure integer programming problem
    b. mixed integer programming problem
    c. zero-one programming problem
    d. continuous programming problem
48. Dynamic programming is concerned with the theory of _____decision process
    a. single-stage
    b. multi-stage
    c. dynamic
    d. static
49. Time-dependent decision-making problems can be solved by
    a. integer
    b. linear
    c. goal
    d. dynamic
50. The area bounded by all the given constraints is called
    a. feasible region
    b. basic solution
    c. optimal basic feasible solution
    d. basic feasible solution

Answer

1 (c)	2 (a)	3 (a)	4 (b)	5 (a)	6 (d)	7 (b)	8 (a)
9 (d)	10 (c)	11 (b)	12 (b)	13 (a)	14 (b)	15 (c)	16 (a)
17 (a)	18 (c)	19 (b)	20 (a)	21 (a)	22 (b)	23 (d)	24 (d)
25 (d)	26 (a)	27 (d)	28 (c)	29 (d)	30 (a)	31 (b)	32 (b)
33 (b)	34 (c)	35 (a)	36 (a)	37 (b)	38 (a)	39 (c)	40 (b)
41 (b)	42 (c)	43 (a)	44 (a)	45 (b)	46 (d)	47 (c)	48 (b)
49 (d)	50 (a)						